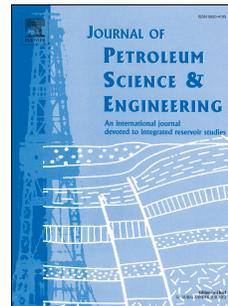


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Estimating source rock parameters using wireline data: An example from Dezful Embayment, South West of Iran

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1 **Estimating Source Rock Parameters Using Wireline Data: An Example from Dezful**

2 **Embayment, South West of Iran**

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8 **Abstract**

9 Availability and high potential of wireline data to correlate with geochemical properties convinced petroleum
10 geologists to use them for source rock detection and calculating their richness. In this research, intelligent
11 techniques and mathematical relationships were used to evaluate source rock potential and organic matter type
12 indirectly. Artificial neural networks (ANN) and ΔLogR techniques were successfully used to model the relation
13 between wireline logs and Total Organic Carbon (TOC) content. Furthermore, wireline data and TOC values
14 were used as input data to model a second ANN for S_2 parameter (present hydrocarbon potential) calculation.
15 Owing to its great ability in the course of solving non-linear problems with overwhelming complexity, the back
16 propagation method was used to train the networks using 70 points datasets. Predicted TOC contents were
17 validated by Rock-Eval pyrolysis results of which revealed dependency of the ΔLogR accuracy to the organic
18 richness and lithology, and therefore higher precision of the ANN outputs in compare to the ΔLogR results.
19 Hydrogen Index (HI) and kerogen type were also effectively predicted using mathematical relationship between
20 TOC and S_2 factors. Reliability of all steps of the methodology was approved using a 16 members retest dataset
21 for which testing predicted parameters against measured data demonstrated good correlation coefficients
22 combined with negligible errors. Finally, applicability of the methodology was checked by applying it on two
23 wells in the Dezful Embayment to evaluate geochemical and depositional properties of the Paleocene-Early
24 Oligocene Pabdeh Formation.

25 **Keywords**

26 Artificial neural network; wireline data; Source rock; Dezful Embayment; Rock-Eval pyrolysis.

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